**Improving Outcomes and Care Experience among Dual Eligible Members: The Role of Health System Factors**

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| Challenge | **The complex health and social needs of dual eligible members (e.g. Medi-cal and Medicare) puts them at higher risk for persistently high health care costs, but little is known about healthcare outcomes and modifiable drivers of these costs.** KPNC is developing innovative interventions. The proposed study will be among the first to identify health system factors associated with care processes and outcomes among dual eligibles in a capitated health care system overall and across coverage subtypes. |
| Existing Evidence | At KPNC, dual eligibles represent only 4% of all newly enrolled Medicaid members, but account for more than 10% of high cost members. 1 Fragmentation of health care services may impede care optimization; integrated care may improve value,2 but results from various managed care plans are mixed, with likely variability of populations and interventions.3,4,5-11 Little evidence exists about health system level interventions might reduce low value, expensive utilization and improve care among dual eligibles.9,10 |
| Target Population | KPNC members who became newly dually eligible between 2016 and 2019, stratified by dual enrollment status: Special Needs Population (SNP) + Medicaid Managed Care (MCMC), SNP only, Medicare + MCMC, and Medicare Only (Figure 1). |
| Intervention or Exposure | Key exposures: dual enrollment status and health system level factors for utilization from prior research studies.  Primary outcome: readmission or admission to the hospital or emergency department (ED) for an ambulatory sensitive condition during the year following dual eligibility.  Methods: microsimulation to evaluate changing modifiable factors and Cox PH models (i.e., dual enrollment status, engagement in kp.org) on risk of the primary outcome. |
| **Outcomes/Key Findings** | **Facilities varied in outcomes; the lowest region (Sacramento) had 30% lower risk of potentially avoidable ED and hospital use than the highest region (Redwood City). Models suggest enrolling dual eligible currently in Medicare Only or D-SNP Only into D-SNP plus Medicaid Managed care may markedly reduce risk (Figure 2).**  There are significant differences in the baseline health, demographics and healthcare utilization between the dual eligible subgroups. [Table 1] :  Factors associated with ***lower*** risk (see also Table 2)  -older age (>50 years); enrollment in both D-SNP and Medicaid or in Medicare alone (versus D-SNP only); Asian race; discordant patient/provider language.  Factors associated with ***higher*** risk  -not using the patient portal [HR: 1.34; 95% Confidence Interval:(1.2, 1.5)]; multi-morbidity;  living in a lower socioeconomic status neighborhood |
| **Resulting Action/Change** | **Work with the SNP group in the TPMG consulting group and the regional hospital resource management group to interpret findings and to identify potential avenues for intervention.** |
| Additional Recommendations | Assessing reasons for variation in dual enrollment in D-SNP plus MCMC may be informative; evaluation of TPMG leadership awareness of findings and any recommendations for further study that would inform operations. |
| Implementation Tools | We will explore whether the simulation tool created as part of this project might be useful to TPMG in identifying potential intervention components. |
| Implementation Measurement | NA |
| Reference | Figure 1. Cohort building algorithm for the study    Figure 2. Microsimulation: Effect of switching coverage status for dual eligible on time to avoidable hospitalizations and ED visits    Table 1. Patient characteristics of the dual eligible population studied   |  |  |  |  |  |  |  |  | | --- | --- | --- | --- | --- | --- | --- | --- | | **Independent factor** | **Level** | **All (N=36,961)\* n(%)** | **D-SNP Only (N=13,941)\* n(%)** | **D-SNP+MCMC (N=2,011)\* n(%)** | **KPSA Only (N=11,916)\* n(%)** | **KPSA+MCMC /MCMC Only (N=9,093)\* n(%)** | **P Value** | | Patient Age on the Index Date | Mean (SD) | 64.69 (13.61) | 64.46 (13.65) | 61.09 (12.86) | 69.32 (13.47) | 59.78 (11.73) | <0.0001\* | | Sex |  |  |  |  |  |  | <0.0001\* | |  | FEMALE | 21852 (59.12) | 8166 (58.58) | 1147 (57.04) | 7349 (61.67) | 5190 (57.08) |  | |  | MALE | 15107 (40.88) | 5774 (41.42) | 864 (42.96) | 4567 (38.33) | 3902 (42.92) |  | | Race/Ethnicity |  |  |  |  |  |  | <0.0001\* | |  | 1.White | 13821 (37.39) | 4396 (31.53) | 886 (44.06) | 5023 (42.15) | 3516 (38.67) |  | |  | 2.Asian | 8167 (22.10) | 3403 (24.41) | 488 (24.27) | 2238 (18.78) | 2038 (22.41) |  | |  | 3.Black | 4980 (13.47) | 2054 (14.73) | 214 (10.64) | 1495 (12.55) | 1217 (13.38) |  | |  | 4.Hispanic | 7849 (21.24) | 3144 (22.55) | 330 (16.41) | 2531 (21.24) | 1844 (20.28) |  | |  | 5.Other | 639 (1.73) | 253 (1.81) | 33 (1.64) | 177 (1.49) | 176 (1.94) |  | |  | 6.Unknown | 1505 (4.07) | 691 (4.96) | 60 (2.98) | 452 (3.79) | 302 (3.32) |  | | Standardized Neighborhood Deprivation Index Score | Mean (SD) | 0.24 (0.98) | 0.39 (1.03) | 0.15 (0.88) | 0.15 (0.95) | 0.16 (0.94) | <0.0001\* | |  |  |  |  |  |  |  |  | | Standardized Neighborhood Deprivation Index (quartiles) | Q1 | 4912 (13.29) | 1450 (10.40) | 287 (14.27) | 1814 (15.22) | 1361 (14.97) | <0.0001\* | |  | Q2 | 9490 (25.68) | 3196 (22.93) | 525 (26.11) | 3333 (27.97) | 2436 (26.79) |  | |  | Q3 | 9964 (26.96) | 3633 (26.06) | 605 (30.08) | 3184 (26.72) | 2542 (27.96) |  | |  | Q4 | 11843 (32.04) | 5160 (37.01) | 589 (29.29) | 3377 (28.34) | 2717 (29.88) |  | |  | Unknown | 752 (2.03) | 502 (3.60) | 5 (0.25) | 208 (1.75) | 37 (0.41) |  | |  |  |  |  |  |  |  |  | | Most Recent BMI Prior to the Index | 1.Under/Normal | 7327 (19.82) | 1723 (12.36) | 534 (26.55) | 3022 (25.36) | 2048 (22.52) | <0.0001\* | |  | 2.Overweight | 7324 (19.82) | 1693 (12.14) | 525 (26.11) | 2675 (22.45) | 2431 (26.73) |  | |  | 3.Obese | 8785 (23.77) | 2047 (14.68) | 727 (36.15) | 2699 (22.65) | 3312 (36.42) |  | |  | 4.Unknown | 13525 (36.59) | 8478 (60.81) | 225 (11.19) | 3520 (29.54) | 1302 (14.32) |  | |  |  |  |  |  |  |  |  | | Baseline Smoking Status | 1.None | 12945 (35.02) | 2957 (21.21) | 839 (41.72) | 4702 (39.46) | 4447 (48.91) | <0.0001\* | |  | 2.Former | 6829 (18.48) | 1363 (9.78) | 459 (22.82) | 2675 (22.45) | 2332 (25.65) |  | |  | 3.Current | 2349 (6.36) | 669 (4.80) | 180 (8.95) | 711 (5.97) | 789 (8.68) |  | |  | 4.Unknown | 14838 (40.15) | 8952 (64.21) | 533 (26.50) | 3828 (32.12) | 1525 (16.77) |  | |  |  |  |  |  |  |  |  | | Alcohol Consumption | No | 13112 (35.48) | 2635 (18.90) | 874 (43.46) | 5012 (42.06) | 4591 (50.49) | <0.0001\* | |  | Yes | 5066 (13.71) | 941 (6.75) | 358 (17.80) | 1776 (14.90) | 1991 (21.90) |  | |  | Not applicable/Unknown | 18783 (50.82) | 10365 (74.35) | 779 (38.74) | 5128 (43.03) | 2511 (27.61) |  | | Doing any Exercise |  |  |  |  |  |  | <0.0001\* | |  | No | 11984 (32.42) | 2632 (18.88) | 818 (40.68) | 4756 (39.91) | 3778 (41.55) |  | |  | Yes | 10451 (28.28) | 2350 (16.86) | 972 (48.33) | 3246 (27.24) | 3883 (42.70) |  | |  | Not applicable/Unknown | 14526 (39.30) | 8959 (64.26) | 221 (10.99) | 3914 (32.85) | 1432 (15.75) |  | |  |  |  |  |  |  |  |  | | 150 Minutes MVPA/Week | No | 17070 (46.18) | 3731 (26.76) | 1284 (63.85) | 6390 (53.63) | 5665 (62.30) | <0.0001\* | |  | Yes | 5290 (14.31) | 1232 (8.84) | 500 (24.86) | 1590 (13.34) | 1968 (21.64) |  | |  | Not applicable/Unknown | 14601 (39.50) | 8978 (64.40) | 227 (11.29) | 3936 (33.03) | 1460 (16.06) |  | | Elixhauser Comorbidity Index | Mean (SD) | 4.94 (3.78) | 4.68 (3.60) | 4.68 (3.53) | 5.56 (4.02) | 4.57 (3.70) | <0.0001\* | |  |  |  |  |  |  |  |  | | Patient/provider race concordance | No | 19107 (51.70) | 6442 (46.21) | 1044 (51.91) | 6580 (55.22) | 5041 (55.44) | <0.0001\* | |  | Yes | 13717 (37.11) | 5115 (36.69) | 867 (43.11) | 4151 (34.84) | 3584 (39.41) |  | |  | Not applicable/Unknown | 4137 (11.19) | 2384 (17.10) | 100 (4.97) | 1185 (9.94) | 468 (5.15) |  | |  |  |  |  |  |  |  |  | | Patient-Physician Language Concordance | No | 5605 (15.16) | 2726 (19.55) | 247 (12.28) | 1339 (11.24) | 1293 (14.22) | <0.0001\* | |  | Yes | 31215 (84.45) | 11151 (79.99) | 1761 (87.57) | 10518 (88.27) | 7785 (85.62) |  | |  | Not applicable/Unknown | 141 (0.38) | 64 (0.46) | 3 (0.15) | 59 (0.50) | 15 (0.16) |  | |  |  |  |  |  |  |  |  | | Kp.org Registration | No | 16320 (44.15) | 9005 (64.59) | 450 (22.38) | 4667 (39.17) | 2198 (24.17) | <0.0001\* | |  | Yes | 20641 (55.85) | 4936 (35.41) | 1561 (77.62) | 7249 (60.83) | 6895 (75.83) |  | |  |  |  |  |  |  |  |  | | Kp.org Use at Baseline | No | 21928 (59.33) | 10902 (78.20) | 684 (34.01) | 6710 (56.31) | 3632 (39.94) | <0.0001\* | |  | Yes | 15033 (40.67) | 3039 (21.80) | 1327 (65.99) | 5206 (43.69) | 5461 (60.06) |  | | # of Outpatient Visits Within 24 Months Before Index Date | Mean (SD) | 10.76 (18.14) | 8.14 (14.91) | 12.11 (18.96) | 10.23 (17.16) | 12.79 (20.55) | <0.0001\* | | # of ED Visits Within 24 Months Before Index Date | Mean (SD) | 2.45 (2.73) | 2.27 (2.58) | 2.08 (1.90) | 2.63 (2.83) | 2.45 (2.86) | <0.0001\* | | # of Inpatient Visits Within 24 Months Before Index Date | Mean (SD) | 1.74 (1.35) | 1.57 (1.18) | 1.62 (1.11) | 1.81 (1.35) | 1.75 (1.47) | 0.0002 | | cms\_risk\_ | Mean (SD) | 1.27 (1.05) | 1.13 (0.90) | 1.12 (0.64) | 1.46 (1.22) | 1.38 (1.08) | <0.0001\* | | Proximity to Primary KP Facility | Mean (SD) | 8.43 (53.18) | 8.52 (56.24) | 5.29 (6.20) | 9.30 (57.86) | 7.89 (47.68) | 0.0117 |   Table 2. Results of Cox Proportional Hazards Models Estimating Time to Avoidable Hospitalizatio or ED Use During the 1st 12 Months Follow Dual Eligibility   |  |  |  |  | | --- | --- | --- | --- | | **Covariates** |  | **Hazard Ratio (Adjusted)** | **95% Confidence Interval** | | Facility (ref=Central Valley) |  |  |  | |  | Diablo | 0.87 | (0.7,1.08) | |  | East Bay | 0.81 | (0.66,0.98) | |  | Fresno | 0.78 | (0.62,0.97) | |  | Greater San Francisco | 0.74 | (0.58,0.95) | |  | Greater Southern Alameda | 0.75 | (0.6,0.93) | |  | Marin / Sonoma | 0.87 | (0.68,1.11) | |  | Napa / Solano | 0.83 | (0.66,1.05) | |  | Redwood City | 1 | (0.58,1.73) | |  | Roseville | 0.71 | (0.57,0.88) | |  | Sacramento | 0.69 | (0.57,0.85) | |  | San Jose | 0.8 | (0.58,1.11) | |  | Santa Clara | 0.75 | (0.55,1.02) | |  | South Sacramento | 0.74 | (0.6,0.9) | | Age (ref=<50) | Age:(50,65] | 0.69 | (0.6,0.8) | |  | Age:(65,80] | 0.58 | (0.5,0.68) | |  | Age:(80,106] | 0.7 | (0.58,0.84) | | Dual Subtype (ref=D-SNP Only) | Dual:D-SNP+MCMC | 0.76 | (0.6,0.96) | |  | Dual:KPSA Only | 0.82 | (0.73,0.93) | |  | Dual:KPSA+MCMC/MCMC Only | 0.91 | (0.79,1.06) | | Race (ref=white) | Race:Asian | 0.73 | (0.61,0.87) | |  | Race:Black | 1.05 | (0.91,1.2) | |  | Race:Latino | 0.96 | (0.84,1.1) | |  | Race:Missing | 1.08 | (0.73,1.61) | |  | Race:Other/Mixed | 1.04 | (0.75,1.43) | | Elixhauser Comorbidity Score (ref=Quartile 1: lowest comorbidity) | Elix:Q2:3-4 | 3.48 | (2.73,4.45) | |  | Elix:Q3:5-7 | 7.78 | (6.06,9.99) | |  | Elix:Q4:7-23 | 19.92 | (15.82,25.07) | |  | Elix:Miss | 0 | (0,Inf) | | Neighborhood Deprivation Index (ref=Quartile 1: highest SES) | NDI:Q2 | 1.28 | (1.05,1.57) | |  | NDI:Q3 | 1.41 | (1.16,1.72) | |  | NDI:Q4 | 1.53 | (1.26,1.86) | |  | NDI:Miss | 1.43 | (1.01,2.03) | | KP.org Use (rer=yes) | Kp\_org:No | 1.34 | (1.2,1.5) | | Race concordance between patient and physician (ref=yes) | Race concord:No | 1.07 | (0.95,1.21) | |  | Race concord: Missing | 0.96 | (0.78,1.19) | | Language concordance between patient and physician (ref=yes) | Lang concord:No | 0.81 | (0.68,0.96) | |  | Lang concord: Missing | 2.85 | (0.71,11.49) |   **References:**   1. 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| Challenge | **BOLD text** |
| Existing Evidence | Normal text |
| Target Population | Normal text |
| Intervention or Exposure | Normal text |
| **Outcomes/Key Findings** | **BOLD summary sentence.** Normal text supporting sentence(s), as needed. |
| **Resulting Action/Change** | **BOLD text** |
| Additional Recommendations | Normal text |
| Implementation Tools | Normal text |
| Implementation Measurement | Normal text |
| Reference | Figure, table, graphical abstract  doi: |
| In carrying out this project, what problems or barriers did you encounter? (50 words or less) |  |
| In your experience with this project, what was the most positive or constructive aspect? (50 words or less) |  |
| Dissemination -- did your project lead to a presentation, report or publication? | No, please describe barriers, if any.  Yes, please list. |
| Did you or others learn something else from your project? | Formed a new relationship  Learned that the right data aren’t currently available  Identified unanticipated barriers to improving clinical practice  Other learnings |